ABSTRACT

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Title of diploma thesis: Determination of apoptotic markers in Ehrlich solid tumor

One approach to improve efficacy of anti-cancer drugs is their combination with natural compounds, e.g. sesquiterpenes. The mechanism of action of sesquiterpenes is based also on the activation of apoptosis. The aim of this diploma thesis was to determine the effect of selected sesquiterpenes *β*-caryophyllene oxid (CAO) and *trans*-nerolidol (NER) on the efficacy of classical cytostatic drug doxorubicin (DOX) on Ehrlich solid tumor (EST) cells in both *in vivo* and *in vitro* models. Determination of proapoptotic and antiapoptotic markers as well as the activities of caspases 2, 3 and 7 in given models was also performed. Expressions of proapoptotic and antiapoptotic molecules were examined using western blot analysis. The activities of caspases 2, 3 and 7 were measured using the luminescence test. Metabolic activity of cells was evaluated by the MTT test. The mice with inoculated EST cells were treated with DOX + CAO, DOX + NER and DOX alone and tumor growth was monitored. In both models, increased expression of proapoptotic markers and decreased expression of antiapoptotic markers was observed in most cases. The activities of caspases 3 and 7 were increased *in vivo* and *in vitro*. DOX exerted the strongest inhibitory effect on the viability of EST cells, in combination with sesquiterpenes the antagonistic effect occurred in the *in vitro* model. The most significant decrease in tumor weight was observed after the administration of DOX alone and DOX + CAO 100 mg/kg. Although sesquiterpenes CAO and NER in combination with DOX supported the initiation of apoptosis *in vivo* and *in vitro*, they did not improve DOX efficacy *in vivo.*